

C-2373 CONT.

#### Abstract

A fuel processing method is operable to remove substantially all of the sulfur present in an undiluted oxygenated hydrocarbon fuel stock supply which contains an oxygenate and which is used to power a fuel cell power plant in a mobile environment, such as an automobile, bus, truck, boat, or the like, or in a stationary environment. The power plant hydrogen fuel source can be gasoline, diesel fuel, or other like fuels which contain relatively high levels of organic sulfur compounds such as mercaptans, sulfides, disulfides, and the like. The undiluted hydrocarbon fuel supply is passed through a desulfurizer bed wherein essentially all of the sulfur in the organic sulfur compounds reacts with the nickel reactant, and is converted to nickel sulfide, while the now desulfurized hydrocarbon fuel supply continues through the remainder of the fuel processing system. The method does not require the addition of steam or a hydrogen source to the fuel stream prior to the desulfurizing step. The method can be used to desulfurize either a liquid or a gaseous fuel stream, which contains an oxygenate such as MTBE, ethanol, methanol, or the like. The inclusion of the oxygenate serves to extend the useful life of the desulfurization method.